October 10, 2022 Education Working Group Call

Attendees: Gerbrand Koren, Jason McLachlan, John Zobitz, Abby Lewis, Jody Peters. Mary Lofton
Regrets: Cazimir Kowalski

Agenda/Notes:

1. Updates or Requests for Input
    a. Macrosystems EDDIE
        i. Have 3 of the 4 modules developed. Working on the fourth one now which is on data assimilation. Piloted it in a 4K level class at VT last week. Everything worked. Carl Boettiger will test it next week. Have another person testing the uncertainty module this week.
        ii. Still looking for faculty to test these modules. But think it will be slower going getting faculty to test modules 6 and 7
            ● Module 6 = Understanding uncertainty
            ● Module 7 = Using data to improve forecasts (Data assimilation)
        iii. Jason may be able to test these
        iv. Lead time needed is getting pre- and post-surveys of students. Give Mary the roster with 3-4 days notice to make the links for the surveys available.
        v. Then give students 10-12 minutes to do the pre-survey
    b. Ethics in Forecasting Project Updates
        i. Cazimir and Jason have a draft text for their module. But are still needs to be worked on.
            ● This module builds on a semester long project Georgia Smies data science and intro to R for primarily Native American body of students. Context is water quality and how to account for cultural values and the interests of Indigenous communities in reports to the EPA (based on real-world application that Georgia works on with tribes as a consultant). Could grow into something that works for EPA and tribes and could become a series on water quality and could potentially interact with Project EDDIE.
            ● Jason will be talking with Al Kusliki from AIHEC (American Indian Higher Education Consortium). AIHEC is interested in learning more and if AIHEC endorses it, it will get on the curriculum for 40 Native American serving schools.
            ● For the ethics paper there will be a modification since we don't expect the paper will go to only a primarily Native American community - how do you talk to people about how their values might influence assessing water quality
            ● Idea is to get people to recognize the potential red flags so they can start conversations to know issues will come up and be aware not to oversimplify

      ii.   Abby checked in with Olivia. Not too much progress on her fisheries forecasting module so far. She has had prelims and field work.
- She may be interested in collaborating with Dexter. Abby will connect Olivia and Dexter to see if he can provide a first line of support and to keep Olivia up to date.

     iii.   Broad goal - have set of 3 different teaching exercises that can be published as a set. Could be flexible and could be expand on in the future.

     iv.   From this call want to come up with a game plan and timeline to get things done.
- Jason/Caz - can have early November be a deadline for them
- Jason could check in with Olivia to see if he can help
- For John, can't meet the November deadline. Thinks the module he is working on is a good outline, but needs to classroom test it. Which he could do in a class this spring. If the timeline shifts, then perhaps
- Keep moving with the set of modules we have. But then having an archive on QUBES (or elsewhere) and being able to continue to compile teaching materials related to ethics in forecasting.
- Think it would be good to have the DEI working group input on the ethics in forecasting modules as well.
- If we have something we think is important to get across on ethics and forecasting. Have the idea that we are building online tools. The set that are ready for Abby's paper will be what it is, but if that is the starting point for future things, so it might be that the paper can jumpstart ideas. That way we won't have to give up on things we think are important given the timeline for the paper.
- Abby's module - shows examples and fosters conversations. It is a baseline resource that can be built on in the future.

c. Antoinette's learning goals and concepts - brainstorm case studies

      i.   An update from Jason that is tangential to Antoinette. Chad Smith is also at U of New Mexico, Gallup with Antoinette. Jason is starting to talk with Chad to see what help he needs as he is developing his course. Pinyon pine is a key food sources for the Navajo Nation and is endanger from climate change. Jason is trying to see if there is a place to think about Pinyon pine to think about species shift due to climate change. It would be really basic at the start and start simple. Jason is hopeful to develop this further.

d. Olivia's Population Ecology Class

e. Anna - Forecasting, Prediction, Projection Vocabulary Manuscript

f. Mike Dietze's workshop for Flux Course on a carbon cycle forecast - https://github.com/mdietze/FluxCourseForecast

g. Gerbrand updates

      i.   Working on developing teaching materials using Jupyter notebook (similar to R Shiny, python based vs R based). Will provide notebooks to students - first year bachelors students. They will work through the code. Working on carbon cycling. Looking to find a good place to store the notebooks. 2 options - have it run in the cloud or provide the notebook as a download option and have them run it locally. Afraid that running it locally will make Gerbrand become the help desk

      ii.   Rankulab. Familiar with Google co-lab. Not sure how his university will think of using Google in an educational environment. They have a contract with Microsoft.

      iii.   Looking for a good, stable interface, where as a teacher, can deploy 10-30 things

      iv.   Mary recommends mybinder.org but it is slow. However, doesn't require students to make an account, so privacy is not an issue.

- Can students save anything? Not sure. Student download and re-upload

      v.   RStudio Cloud may be an option but you may have to pay. It took Mary months to get RStudio Cloud through their legal dept for Virginia Tech. Think will need to

      vi.   John Tipton at U of Arkansas uses the cloud. He could be a good contact person

h. John's book update: "Exploring Modeling with Data and Differential Equations Using R". The book is divided into 4 parts: modeling, parameterization, stability analysis, stochastic models. Will have an online version as well as a hard copy.

      i.   Link to free online version (will be updated once I approve the final edits): https://jmzobitz.github.io/ModelingWithR/index.html

      ii.   Link to book: https://www.routledge.com/Exploring-Modeling-with-Data-and-Differential-Equations-Using-R/Zobitz/p/book/9781032259482

2. Forecasting Ethics material (Jody is leaving this in the notes for reference)

a. Here is an overview of what was developed: start with a think-pair-share to discuss the Ecological Forecasting Ethics: Lessons from Covid-19 post in Dynamic Ecology. This would then be followed by 3 topics presented in the post, 1) uncertainty, 2) unintended consequences and conflict of interest, and 3) sins of omission vs commission. The material provides a hypothetical ecological example with questions and real-world examples/news stories. There are also a couple of examples of further readings and suggestions for the next steps forward.

b. Idea from Mike on Slack: One other thing we always talk about in my class when we cover forecast ethics (and which might build well off the "sins" example in the slide deck) is the question of which forecasts should be public goods and which are appropriate for private investment. If all forecasts have

to be public goods, there will be a lot less forecasting and possibly less innovation than if the private sector invests, but on the flip side there may be forecasts where there's a moral obligation to disclose the prediction to everyone.

    c. Update from Abby: I actually put a bit of work into this last semester and drafted the start of a formal resource that we could publish:

    d. The core group that worked on this project (Abby, Sydne, Ryan, Quinn) were potentially interested in trying to publish it at Teaching Issues in Ecology and Evolution. Sydne had suggested this journal, but Abby is open to others. Think about putting it up on QUBES to get DOI, but make sure that uploading to QUBES won't affect submission to a journal.

        i. Looking for people to help write one of the examples. If there are 1-2 people who are motivated this can be helpful. Abby can't work on this for the next 2 weeks

        ii. If anyone is teaching an interested in trying this out, or reviewing it from a pedagogical perspective

        iii. Short workshop during EFI meeting to walk through as a group as an activity or collaboratively write one of the case studies. Is there anyone in the education group willing to lead this?

            ● Talk about discussion questions for each case study

        iv. Sydne is happy to provide some rubrics for assessment of student learning to this document once the examples are nailed down

        v. Jason willing to include in his course next fall

    e. Is there a model that was connected to the example?

    f. Put in context about decisions people are making about the model have ethical challenges that people need to consider

    g. Could talk to Georgia about the drinking water example and check in with Abbyt o see. Would be a nice one to emphasize that the communities affected by environmental decisions - how are they involved with the decisions that are made.

3. Open Book Project to keep in mind and mash up of notes from previous calls

    a. There is potential to use the educational materials developed for the Sloan grant or with Olivia's class to start providing content for this that other EFI members could contribute to.

        i. This is a book you would read before you read Mike's Forecasting book

        ii. If we start to develop modular materials they could be included in such a book

        iii. Can start to develop a list of the components that would be useful to include in a book and think about how to make it applicable to a wide range of students from many different backgrounds

iv.   Think about developing slides/materials that provide context

v.   Running list of who has expressed interest at one time or another
- Jason McLachlan, Shannon LaDeau, Elva Escobar

vi.   Has anyone seen the [Open Forecasting Textbook](#) (does exist as a [paperback](#) as well)
- In the Preface this is for a 3rd year undergrad intro master's course
- Interesting template. Success in part due to free online and R packages are nicely user friendly
- This is a bookdown format where R code is integrated and is a living document
- Wouldn't get the credit of something like an AGU Monograph, but would be more broadly available.
- Could do something that are RMarkdowns that could be combined as a book
- Loop John Zobitz into this. He is also writing a book for his courses. Mike has used some of his chapters in his 300 level course.
- Do this in the context of NEON data and walking through all the steps of forecasting. Could get long, but would be a nice resource.
- A self-contained book to walk through. Could reference other books.

vii.   This sounds like a strong potential for a proposal for NSF Education Directorates, especially if we could bring in an education evaluator who evaluates the open source, collaborative textbook.
- If we structured it well it could have a strong educational research component